

New points in IS 335-2018

I	Classification of transformer oil	1 Type I: Transformer oil w.r.t IEC60296			
		2 Type II: High viscosity transformer oil			
		3 Type III: Low viscosity switchgear oil			
II	New Concept	Lowest cold start energizing temperature (pour point of oil : temperature)			
III	New properties included	1 Sulfur content			
		2 Gassing Tendency			
		3 ECT			
		4 PCA			
		5 PCB			
		6 Furan			
IV	Methods revised	1 Acidity			
		2 Corrosive Sulfur			
		3 Oxidation Stability			
V	Standard merged	1 IS 335			
		2 IS 12463			
VI	Acceptable Test Values changed	KV, density, PP, water content, BDV, DDF, acidity, DBDS, me compounds, OS parameters, flash point, PCA and PCB			
VII	Removed typical parameters which was not part of specifications	1 Open beaker ageing			
		2 SK value			
		3 Resistivity			

Changes by clause.

Sr.No	Parameter	IS 2018			IS 335 1993 RA 2010		Remark
		Type I	Type II	Type III	Method	Method	
1	Viscosity, cSt	0°C	-	-	IS 1448 P25	Not mentioned	27
		27°C	-	-	IS 1448 P25	Under consideration	
		40°C	12	15	3.5	IS 1448 P25	
		-30°C	1800	-	IS 16084	Not mentioned	
2	Pour Point, °C max	-40°C	-	-	IS 1448 P10/Sec2	-6 °C	
		-40°C	-10°C	-60°C	IS 1448 P10/Sec2	50	
		For Bulk: 30; For drum/IBC: 40	As such: 30; After laboratory treatment: 70	0.895	IS 1448 P16	Not mentioned	
4	BDV, KV Min	20°C	-	-	IS 1448 P16	0.89	
		29.5°C	-	Removed	IS 16086	IS 6262	0.002
5	Density, g/ml max	DDF, 90°C Max	-	0.005	IS 13236	Not mentioned	
		29.5°C	-	No general requirement (agreed bet customer and supplier)	IEC 62021-1	IS 1448 P2	0.03
6	Particle content	Total	-	0.01	ASTM D 971	Do	NIL
		Inorganic acidity	-	Removed	IS 6104	0.04N/m at 27°C	
7	Acidity, mg KOH/g max	No general requirement (recommende 40.0)	-	-	ISO 14596 or ASTM D4294	Not Mentioned	
		No general requirement	-	-	DIN 51353	Annex B	Non corrosive
8	Corrosive Sulphur	No general requirement	-	-	IS 16310	Not corrosive	
		Not corrosive	-	-	IS 13161/IEC 60666	Max 0.5 SK value	quantitative method is under consideration in 1993 RA 2010
9	Potentially corrosive sulphur	Uninhibited: <0.01%; Trace inhibited: <0.08%; Inhibited: 0.08-0.4%	-	-	IS 13161/IEC 60666	Not Mentioned	
		Not detectable (<5mg/kg) or agreed upon with the purchaser	-	Supplied shall declare	IS 13631/IEC 60666	Not Mentioned	
10	Metal passivator	Other additive	-	-	IS 15668	Not mentioned	
		2-Furfural and related compounds	Not detectable (<5mg/kg) or agreed upon with the purchaser	U: 164 hrs; T: 332 hrs; I: 500 hrs	IS 12422 Method C	164 hrs	
11	Gassing tendency	Total Acidity	1.2 mg KOH/g, Max	IS 12422	IS 335 Annex C	0.4 mg KOH/g	
		Sludge	0.8%, Max	IS 12422	IS 335 Annex C	0.1% w/w	
12	Oxidation stability	DDF at 90°C	0.5%, Max	IS 12422	IS 12422	Not Mentioned	
		No general requirement (agreed between purchaser and supplier)	IEC 60628 Method A	IS 335:2018 cl.614	Not Mentioned	Not Mentioned	
13	Inhibitors content	No general requirement (agreed between purchaser and supplier)	IS 335:2018 cl.614	Not Mentioned	IS 1448 P21	140°C	
		Uninhibited: <0.01%; Trace inhibited: <0.08%; Inhibited: 0.08-0.4%	IS 13161/IEC 60666	Max 0.5 SK value	IS 16082	Not Mentioned	
14	Other Removed tests	Other Removed tests	-	-	IS 13631/IEC 60666	Not Mentioned	
		1 Open beaker aging	-	-	IS 15668	Not mentioned	
15	SK value	2 SK value	-	-	IS 15668	Not mentioned	
		3 SK value	-	-	IS 15668	Not mentioned	

*Other Additional tests are not included in specifications in IS 335:2018

- 1 Sampling, according to IS 6835
- 2 Particle count according to IS 13136
- 3 Stray gassing according to CIGRE brochure 296 or ASTM D7150

New points in IS 335.2018

1	Classification of transformer oil	Type I: Transformer oil w.r.t IEC60296 Type II: High viscosity transformer oil Type III: Low viscosity switchgear oil
2	New Concept	Lowest cold start energizing temperature (pour point of oil should lower 10°C than min charging temperature)
3	New properties included	Sulfur content, gassing tendency, PCA, PCB and furan
4	Methods revised	Acidity, corrosive sulfur, oxidation stability
5	Standard withdrawn	IS 12463
6	Values changed	
7	Removed typical parameters which was not part of specifications	Coeff. of expansion, permittivity, specific heat, thermal conductivity,

STANDARDS		Transformer Oil Specification				Remark
S. No.	Characteristics	IS 12463	IS : 335 , August 2018 Inhibited oil Special Revision Type I	IS : 335 , August 2018 Revision Type II	IEC 60296, 2012	
A.	FUNCTION					
1	KV at 27 °C, mm2/s Max	27	NA	NA	NA	In 2018 standard, viscosity at 40°C is asked, while in 2010 it was asked at 27°C
2	KV at 40 °C, mm2/s Max	NA	12	15	12	
3	KV at 0 °C, mm2/s Max					
4	KV at 30 °C, mm2/s Max	NA	1800	1800	1800	In 2018 standard, PP value is raised
5	Pour Point, °C,Max	-6	-40	-10	-40	In 2018 standard, density is mentioned at 20°C
6	Water Content, mg/kg, Max	50	30	30	30	In 2018 standard, requirement is stringent. The value is reduced.
	Bulk delivery					
7	BDV					No difference except after treatment (70 kV in standard 2018)
	(a) As delivered (kV) Min	30	30	30	30	
	(b) After treatment (kV) , Min	60	70	70	70	
8	Density @ 29.5°C, g /ml Max	NA	NA	NA	NA	In 2018 standard, density is mentioned at 20°C
	Density @ 20°C, g / ml Max	0.89	0.895	0.895	0.895	
9	Resistivity At 90 °C, Min	3.5×10^{12}	NA	NA	NA	Removed from 2018 standard
10	Resistivity At 27 °C, Min	1.50×10^{12}	NA	NA	NA	
	Tan Delta at 90°C,Max	0.002	0.005	0.005	0.005	In 2018, DDF value is increased to 0.005
B.	REFINING / STABILITY					
11	Appearance	Clear & transparent and free from suspended matter or sediments	Clear free from sediment and suspended matter	Clear free from sediment and suspended matter	Clear free from sediment and suspended matter	
12	Colour, Max	NA	NA	NA	NA	
13	Total Acidity, Max	0.03	0.01 mgKOH/g, Max	0.01 mgKOH/g, Max	0.01 mgKOH/g, Max	In 2018 standard, the acidity is reduced. Made it stringent than 2010 standard.
14	Interfacial tension,Min	4.0	No general requirement	No general requirement	No general requirement	*Where it is used as general requirement, a limit of minimum 40 mN/m is recommended.
15	Corrosive Sulphur					
	Potentially Corrosive Sulphur					
16	DBS, mg/kg, Max	NA	Not Corrosive	Not Corrosive	Not Corrosive	Spec is added in 2018 standard. Test method IS 16310
17	Metal Passivator,mg/kg, Max	NA	Not Corrosive	Not Corrosive	Not Corrosive	Spec is added in 2018 standard. Test method IS 16497 (Part 1)
18	Anti-oxidant additives,%, Max	0.3	Not Decable (< 5 mg/kg)	Not Decable (< 5 mg/kg)	Not Decable (< 5 mg/kg)	Spec is added in 2018 standard. Test method IS 15631
19	2-Furfural and related compounds content,	NA	0.08 - 0.4	0.08 - 0.4	0.08 - 0.4	In 2018 standard, total inhibitor content in between 0.08 to 0.04 % considered as inhibited oil
20	Total sulphur Content, %	NA	Not Decable (< 0.05 mg/kg)	Not Decable (< 0.05 mg/kg)	Not Decable (< 0.05 mg/kg)	Spec is added in 2018 standard. Test method IS 15688
C.	PERFORMANCE					
21	O.S (After 16x4 h at 100°C)					This OS test method is not valid in 2018 standard and it is modified as given in sr. no. 22
	(a) Total Acidity, Max	0.4	NA	NA	NA	
	(b) Total Sludge, % Max	0.1	NA	NA	NA	
	(c) DDF @ 90 °C, Max	NA	NA	NA	NA	
	After ageing					
	Resistivity At 27 °C, Min	NA	NA	NA	NA	
	Resistivity At 90 °C, Min	NA	NA	NA	NA	
	DDF @ 90 °C, Max	NA	NA	NA	NA	
	Total Acidity, Max	NA	NA	NA	NA	
	Total Sludge, % Max	NA	NA	NA	NA	
22	O.S (After 500 h at 120°C)					
	(a) Acidity, max mgKOH/g	NA	0.3	0.3	0.3	It is a special requirement for special purpose.
	(b) Total Sludge, % Max	NA	0.05	0.05	0.05	In 2018 standard, the reaction parameters are changed to 120°C from 100°C. The DDF & total S content is added. For this test only total S testing is added. The resultant acceptable limits are changed as mentioned in the table.
	(c) DDF @ 90 °C, Max	NA	0.05	0.05	0.05	
	(d) Total sulphur content, % Max before OS test	NA	0.05	0.05	0.05	
23	Gassing Tendency	NA	No general requirement	No general requirement	No general requirement	Spec is added in 2018 standard. Test method IEC 60628, Method A. If considered, the value be agreed upon
24	ECT	NA	No general requirement	No general requirement	No general requirement	Spec is added in 2018 standard. Test method IEC 60628, Method A. If considered, the value be agreed upon
D.	HEALTH, SAFETY AND ENVIRONMENT (HSE)					
25	Fish Poison,°C (PMCC),Min	140	135	135	135	In 2018 standard, the value is reduced by 5°C
26	Poly cyclic Aromatic (PCA),% mass	NA	3%, Max	3%, Max	3%, Max	Spec is added in 2018 standard. Test method IP 346
27	PCB content	NA	Not Detectable (< 2 mg/kg)	Not Detectable (< 2 mg/kg)	Not Detectable (< 2 mg/kg)	Spec is added in standard 2018. test method IS 16082
28	S.K. Value, %	Under Consideration	NA	NA	NA	Removed from 2018 standard

STANDARDS		Transformer Oil Specification			Remark
S.No.	Characteristics	IS 12463	Inhibited Oil	IEC	
A.	FUNCTION	IS : 335 , August 2018 Revision Type I	IS : 335 , August 2018 Revision Type II	IEC 60296 , 2012	In 2018 standard, oils are classified in to 3 categories as transformer oil Type I, Type II and low temp switchgear oil
1	KV at 27 °C, mm2/s Max	27	NA	NA	In 2018 standard, viscosity at 40°C is asked, while in 2010 it was asked at 27°C
2	KV at 40 °C, mm2/s Max	NA	12	15	
3	KV at 0 °C mm2/s Max	NA	12	12	
4	KV at -30 °C, mm2/s Max	NA	1800	1800	
5	Pour Point, °C,Max	-6	-40	-10	In 2018 standard, PP value is raised
6	Water Content, mg/kg, Max	50	30	30	In 2018 standard, requirement is stringent. The value is reduced.
	Bulk delivery				
7	Drum delivery				
(a)	BDV				No difference except after treatment (70 kV in standard 2018)
(a)	As delivered (kV) Min	30	30	30	
(b)	After treatment (kV), Min	60	70	70	
8	Density @ 25°C ,kg /ml Max	NA	NA	NA	In 2018 standard, density is mentioned at 20°C
9	Density @ 20°C ,kg / ml Max	0.89	0.895	0.895	0.895
10	Resistivity At 90 °C, Min	35×10^{12}	NA	NA	Removed from 2018 standard
	Resistivity At 27 °C, Min	1500×10^{12}	NA	NA	
	Tan Delta at 90°C,Max	0.002	0.005	0.005	In 2018, DDF value is increased to 0.005
B.	REFINING / STABILITY				
11	Appearance	Clear & transparent and free from suspended matter or sediments	Clear free from sediment and suspended matter	Clear free from sediment and suspended matter	
12	Colour, Max	NA	NA	NA	
13	Total Acidity, Max	0.03	0.01 mgKOH/G, Max	0.01 mgKOH/G, Max	In 2018 standard, the acidity is reduced. Made it stringent than 2010 standard.
14	Interfacial tension,Min	40	No general requirement	No general requirement	*Where it is used as general requirement, a limit of minimum 40 mN/m is recommended.
15	Corrosive Sulphur	Not Corrosive	Not Corrosive	Not Corrosive	
	Potentially Corrosive Sulphur	NA	Not Corrosive	Not Corrosive	
16	DDSS, mg/kg, Max	NA	Not Detectable (< 5 mg/kg)	Not Detectable (< 5 mg/kg)	Spec is added in 2018 standard. Test method IS 16310
17	Metal Passivator,mg/kg, Max	NA	Not Detectable (< 5 mg/kg)	Not Detectable (< 5 mg/kg)	Spec is added in 2018 standard. Test method IS 16497 (Part 1)
18	Anti-oxidant additives,%, Max	0.3	0.08 - 0.4	0.08 - 0.4	Spec is added in 2018 standard. Test method IS 13631
19	2-Furanfural and related compounds content,	NA	Not Detectable (< 0.05 mg/kg)	Not Detectable (< 0.05 mg/kg)	In 2018 standard, total inhibitor content in between 0.08 to 0.4 % considered as inhibited oil
20	Total Sulphur Content,%,	NA	0.05	0.05	Spec is added in 2018 standard. Test method IS 15688
C.	PERFORMANCE				
21	O S (After 164 h at 100°C)				This OS test method is not valid in 2018 standard and it is modified as given in sr. no. 22
(a)	Total Acidity, Max	0.4	NA	NA	
(b)	Total Sludge, % Max	0.1	NA	NA	
(c)	DDF @ 90 °C, Max	NA	NA	NA	
	After Ageing				
	Resistivity At 27 °C, Min	NA	NA	NA	
	Resistivity At 90 °C, Min	NA	NA	NA	
	DDF @ 90 °C, Max	NA	NA	NA	
	Total Acidity, Max	NA	NA	NA	
	Total Sludge, % Max	NA	NA	NA	
22	O S (After 500 h at 120°C)				
(a)	Acidity, max mgKOH/G	NA	1.2	1.2	
(b)	Total Sludge, %, Max	0.8	0.8	0.8	In 2018 standard, the traction parameters are changed to 120°C from 100°C. The DDF & total S content is added. For this test only total S testing is added. The resultant acceptable limits are changed as mentioned in the table.
(c)	DDF @ 90 °C, Max	NA	0.5	0.5	
(d)	Total sulphur content, %, Max before OS test	NA	0.05	0.05	
23	Gassing Tendency	NA	No general requirement	No general requirement	Spec is added in 2018 standard. Test method IEC 60628, Method A. If considered, the value be agreed
24	ECT	NA	No general requirement	No general requirement	Spec is added in 2018 standard. Test method CISRE Technical Brochure 170
D.	HEALTH, SAFETY AND ENVIRONMENT (HSE)				
25	Filst Point,°C (PnCCl) Min	140	135	135	In 2018 standard, the value is reduced by 5°C
26	Polyyclic Aromatic (PCA), % mass,	NA	3%, Max	3%, Max	Spec is added in 2018 standard. Test method IP 346
27	PCB content	NA	Not Detectable (< 2 mg/kg)	Not Detectable (< 2 mg/kg)	Spec is added in 2018 standard. Test method IS 16082
28	SIK Value, %	Under Consideration	NA	NA	Removed from 2018 standard

STANDARDS		Transformer Oil Specification			Remark	
S.No.	Characteristics	IS : 335, 2010 No Product	IS : 335, August 2018 Revision Type I	IS : 335, August 2018 Revision Type II	IEC 60296, 2012	
A.	FUNCTION					In 2018 standard, oils are classified in to 3 categories as transformer oil Type I, Type II and low temp switchgear oil
1	KV at 27 °C, mm ² /s, Max	NA	NA	NA	NA	In 2018 standard, viscosity at 40°C is asked, while in 2010 it was asked at 27°C
2	KV at 40 °C, mm ² /s Max	12	15	15	12	
3	KV at 0 °C, mm ² /s Max					
4	KV at -30 °C, mm ² /s Max	1800	1800	1800	1800	
5	Pour Point, °C,Max	-40	-10	-40	-40	In 2018 standard, PP value is raised
6	Water Content, mg/kg, Max					In 2018 standard, requirement is stringent. The value is reduced.
B.	Bulk delivery	30	30			
7	BDV	40	40			No difference except after treatment (70 KV in standard 2018)
	(a) As delivered (KV),Min	30	30	30		
	(b) After treatment (KV), Min	70	70	70		
8	Density @ 29.5°C, g/ml Max	NA	NA	NA	NA	In 2018 standard, density is mentioned at 20°C
9	Resistivity At 90 °C, Min	0.895	0.895	0.895	0.895	Removed from 2018 standard
10	Resistivity At 27 °C, Min	NA	NA	NA	NA	
	Tan Delta at 90°C, Max	0.005	0.005	0.005	0.005	In 2018, DDF value is increased to 0.005
B.	REFINING / STABILITY					
11	Appearance	Clear free from sediment and suspended matter	Clear free from sediment and suspended matter			
12	Colour, Max					
13	Total Acidity, Max	0.01 mgKOH/g, Max	0.01 mgKOH/g, Max	0.01 mgKOH/g, Max	0.01 mgKOH/g, Max	In 2018 standard, the acidity is reduced. Made it stringent than 2010 standard.
14	Interfacial tension,Min	*No general requirement	*No general requirement	No general requirement		*Where it is used as general requirement, a limit of minimum 40 mN/m is recommended.
15	Corrosive Sulphur					
	Potentially Corrosive Sulphur					
16	DBDS, mg/kg, Max	Not Detectable (< 5 mg/kg)	Not Detectable (< 5 mg/kg)	Not Detectable (< 5 mg/kg)	Not Detectable (< 5 mg/kg)	Spec is added in 2018 standard. Test method IS 15310
17	Metal Passivator,mg/kg, Max	Not Detectable (< 5 mg/kg)	Not Detectable (< 5 mg/kg)	Not Detectable (< 5 mg/kg)	Not Detectable (< 5 mg/kg)	Spec is added in 2018 standard. Test method IS 15311
18	Anti-oxidant additives%, Max	<0.08%	< 0.08%	< 0.08%	< 0.08%	In earlier 2010 standard, quantification of inhibitor was absent while in 2018 standard, total inhibitor content shall below 0.01 % is considered as uninhibited oil
19	Furanic compounds	Not Detectable (< 0.05 mg/kg)	Not Detectable (< 0.05 mg/kg)	Not Detectable (< 0.05 mg/kg)	Not Detectable (< 0.05 mg/kg)	Spec is added in 2018 standard. Test method IS 15638
20	Total Sulphur Content	No general requirement	No general requirement	No general requirement	No general requirement	Spec is added in 2018 standard. In case of dispute use ISO 14596 or ASTM D4294
C.	PERFORMANCE					
21	0.5 (After 164 h at 100°C)					This OS test method is not valid in 2018 standard and it is modified as given in SR no 22
	(a) Total Acidity, Max	NA	NA	NA	NA	
	(b) Total Sludge, % Max	NA	NA	NA	NA	
	(c) DDF @ 90 °C, Max	NA	NA	NA	NA	
	After Ageing					
	Resistivity At 27 °C, Min	NA	NA	NA	NA	
	Resistivity At 90 °C, Min	NA	NA	NA	NA	
	DDF @ 90 °C, Max	NA	NA	NA	NA	
	Total Acidity, Max	NA	NA	NA	NA	
	Total Sludge, % Max	NA	NA	NA	NA	
22	0.5 (After 164 h at 120°C)	(After 164 h at 120°C)	(After 164 h at 120°C)	(After 164 h at 120°C)	(After 164 h at 120°C)	In 2018 standard, the reaction parameters are changed to 120°C from 100°C. The DDF is added. The resultant acceptable limits are changed as mentioned in the table.
	(a) Acidity, max mgKOH/G	1.2	1.2	1.2	1.2	
	(b) Total Sludge, %,Max	0.8	0.8	0.8	0.8	
	(c) DDF @ 90 °C, Max	0.5	0.5	0.5	0.5	
23	Gassing Tendency	No general requirement	No general requirement	No general requirement	No general requirement	Spec is added in 2018 standard. Test method IEC 60628, Method A. If considered, the value be agreed upon between supplier and purchaser.
D.	HEALTH,SAFTY AND ENVIRONMENT (HSE)					Spec is added in 2018 standard. Test method CIGRE Technical Brochure 170
24	ECT	No general requirement	No general requirement	No general requirement	No general requirement	
25	Flash Point,°C (PMCC),Min	135	135	135	135	In 2018 standard, the value is reduced by 5°C
26	Polyaromatic Aromatics (PA)%, mass,	3%, Ma,	3%, Max	3%, Max	3%, Max	Spec is added in 2018 standard. Test method IP 345
27	PCB content					
28	S.K. Value, %	NA	NA	NA	NA	Spec is added in standard 2018 test method IS 16082

Transformer Oil Specification					
S. No.	STANDARDS Characteristics	IS : 335, 2010	IS : 335, August 2018 Revision Type I	IS : 335, August 2018 Revision Type II	IEC IEC 60296, 2012
A. FUNCTION					
1	KV at 27 °C, mm ² /s, Max	27	NA	NA	NA
2	KV at 40 °C, mm ² /s, Max	NA	12	15	12
3	KV at 0 °C, mm ² /s, Max				In 2018 standard, viscosity at 40°C is asked, while in 2010 it was asked at 27°C
4	KV at -30 °C, mm ² /s, Max	NA	1800	1800	
5	Pour Point, °C, Max	-6	-40	-10	-4C
6	Water Content, mg/kg, Max				In 2018 standard, requirement is stringent. The value is reduced.
B. REFINING/ STABILITY					
7	Drum delivery				No difference except after treatment (70 kV in standard 2018)
8	BDV				
(a) As delivered (hv), Min	30	30	30	30	
(b) After treatment (hv), Min	60	70	70	70	
9	Resistivity At 90 °C, Min	35×10^{12}	NA	NA	NA
10	Resistivity At 27 °C, Min	1500×10^{12}	NA	NA	NA
11	Tan Delta at 90°C, Max	0.002	0.005	0.005	0.005
12	Appearance		Clear free from sediment and	Clear free from sediment and	
13	Colour, Max	NA	NA	NA	
14	Total Acidity, Max	0.03	0.01 mgKOH/g, Max	0.01 mgKOH/g, Max	In 2018 standard, the acidity is reduced. Made it stringent than 2010 standard.
15	Interfacial Tension, Min	40	*No general requirement	*No general requirement	*Where it is used as general requirement, a limit of minimum 40 mN/m is recommended.
16	Corrosive Sulphur				
17	Potentially Corrosive Sulphur	NA	Not Corrosive	Not Corrosive	
18	IBDS, mg/kg, Max	NA	Not Detectable (< 5 mg/kg)	Not Detectable (< 5 mg/kg)	Spec is added in 2018 standard. Test method IS 16340
19	Metal Passivation, mg/kg, Max	NA	Not Detectable (< 5 mg/kg)	Not Detectable (< 5 mg/kg)	Spec is added in 2018 standard. Test method IS 16497 (Part 1)
20	Anti-oxidant additives %, Max	ND	Not Detectable (< 0.01%)	Not Detectable (< 0.01%)	Spec is added in 2018 standard. Test method IS 13651
21	Furanic compounds	NA	Not Detectable (< 0.05 mg/kg)	Not Detectable (< 0.05 mg/kg)	In earlier 2010 standard, quantification of inhibitor was absent while in 2018 standard, total inhibitor content shall below 0.01 % is considered as uninhibited oil.
22	Total Sulphur Content	NA	No general requirement	No general requirement	Spec is added in 2018 standard. Test method IS 15688
C. PERFORMANCE					
23	O S (After 164 h at 100°C)	0.4	NA	NA	This OS test method is not valid in 2018 standard and it is modified as given in Sr. no. 22
(a)	Total Acidity, Max	0.1	NA	NA	Spec is added in 2018 standard. In case of dispute use ISO 14596 or ASTM D4294
(b)	Total Sludge, % Max	NA	NA	NA	
(c)	DDF @ 90 °C, Max	NA	NA	NA	
D. HEALTH, SAFETY AND ENVIRONMENT (HSE)					
25	Flash Point °C (PMCC) Min	140	135	135	In 2018 standard, the value is reduced by 5°C
26	Polyyclic Aromatics (PCA), % mass,	NA	3%, Max	3%, Max	Spec is added in 2018 standard. Test method IP 346
27	PCB content	NA	Not Detectable (< 2 mg/kg)	Not Detectable (< 2 mg/kg)	Spec is added in 2018 standard. Test method IS 16082
28	S.K. Value, %	Under Consideration	NA	NA	Removed from 2018 standard